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ABSTRACT

This report describes the analyses of student participation in two school nutrition programs, the School Breakfast Program (SBP) and the National School Lunch Program (NSLP). Data were collected from students and their families during the 1983-84 school year as part of the National Evaluation of the School Nutrition Programs (NESNP). Each program was analyzed separately since the extent of student coverage varies. Primary focus was on the estimates of how student participation was affected by changes in the meal price, a key policy tool that program administrators can use to influence both student participation and program revenues simultaneously. The price elasticity of participation provided a convenient measure to judge student response to change in meal prices. Findings indicated that participation in the NSLP was generally inelastic; students were relatively unresponsive to lunch price increases. Participation in the SBP was found to be more elastic; as breakfast prices increased participation could be expected to drop rapidly. Statistical data are included on four tables. A 16-item bibliography is appended. (FMW)

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MODELING STUDENT PARTICIPATION IN SCHOOL NUTRITION PROGRAMS

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MODELING STUDENT PARTICIPATION IN SCHOOL NUTRITION PROGRAMS

Introduction

This report describes analysis of student participation in two school nutrition programs--the School Breakfast Program (SBP) and the National School Lunch Program (NSLP). Data collected from students and their families during the 1983-84 School Year as part of the National Evaluation of the School Nutrition Programs (NESNP) forms the basis for the analysis. The SBP and NSLP are analyzed separately since the extent of student coverage varies under each program.

The federally-sponsored child nutrition programs were developed to enhance the nutritional adequacy of the nations' children. As the largest of these programs, the NSLP and the SBP are effectively targeted toward children in low income households by means of varying the federal per-meal subsidy and by mandating the meal price that students pay. Students from households in which income is below 130 percent of the poverty threshold are eligible to receive free meals; household income between 130 and 185 percent of poverty potentially makes the student eligible for reduced price meals which have a ceiling price of 40 cents. Students living in households in which income is above 185 percent of poverty pay the price set by school food administrators. All meals served under the program receive a federal subsidy, although the paid meal subsidy at 13.5 cents per meal (presently) is modest compared to the free meal subsidy of $1.41. In addition, each lunch served entitles the school to 12 cents worth of commodity subsidies.

The school lunch program is available to close to 90 percent of children attending public schools; in 1987 approximately 24 million students ate a school lunch on a typical day. About 42 percent of those lunches were served free of charge, 7 percent to students at a reduced price, and the remaining 50 percent were served at full price. Federal expenditures for the lunch program are estimated at $3.4 billion in 1987, including cash and the value of commodity subsidies.

The school breakfast program, on the other hand, is available in just over one third of the schools offering the lunch. This program, however, is designed to target schools serving students from predominantly low income families. About 3.7 million students participated on the typical day in 1987--84 percent of the breakfasts were served free of charge, 5.4 percent were served at a reduced price, 10.8 percent were served at full price. The total cost at the federal level stood at $454 million.

The primary focus in this paper is on the estimates of how student participation is affected by changes in the meal price.[1] Such an analysis is of interest because meal price is one of the key policy tools that program administrators have to influence student participation and program revenues simultaneously.[2] The role played by meal price is complicated by the fact that not all students face the same "price" for the school meal. As described

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1. This analysis is drawn from a larger study in which the demographic, economic, and program factors that are related to the frequency of student participation in the meal programs are investigated in a broader context. (See Barnes, Feb. 88).

2. The primary tool that policymakers at the federal level have is the Federal Reimbursement Rate. It is always uncertain how localities will respond to reimbursement changes in their pricing policies. For the sake of exposition, it is not unreasonable to assume that local authorities change the price of a meal by the same amount that the reimbursement rate is changed under alternative proposals.

above, the price a student pays is related to family income, assuming that all students eligible for free or reduced price meals apply for these benefits.

Background

Characteristics of Students in the NSLP. According to the NESNP data, about 38.8 million students across the nation had access to a USDA school lunch in 1983.[3] A little over two-thirds, 68.7 percent, of the students were not classified as either free or reduced-price meal recipients and would have paid "full price" for any lunch they selected; the average price for this lunch was around $.82. Students classified to receive a free USDA school lunch made up 26.2 percent of the population and the remaining 5.1 percent were classified as eligible for a reduced-price lunch. About 13 percent of the students classified as full-price appear to have been potentially qualified for either a reduced-price or a free USDA lunch but were not classified as such--presumably because their families did not apply for benefits.

More than 3 out of 4 students--78.5 percent--selected a USDA lunch at least one day in the typical school week. Indeed, the majority (53 percent) of students ate the lunch every day. However, striking differences in frequency of school lunch participation according to meal price status, grade level, and

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3. School Program Operations (SPO) Data, published by the Food and Nutrition Service, report that approximately 40.3 million students were enrolled in schools over the period covered by the NESNP data. This figure is about 3.9 percent higher than the NESNP estimate. SPO data do not include information on the number or percentage distribution of students by price status classification, however, similar information on the number and distribution of meals served is available. Potentially significant differences in the percentage distribution of meals served by price status occur between the SPO data and estimates generated from the NESNP data. Specific differences between the SPO and NESNP data, and potential reasons for these differences, are discussed in Appendix B of the FNS report on "Characteristics of the National School Lunch and School Breakfast Participants." (August, 1987).

income category were documented. Students classified as either free or reduced-price meal recipients ate the school lunch almost every day, while those paying full-price participated only a little over half of the time. In general, elementary level children tended to participate more often than secondary level children; males tended to participate more often than females.

Characteristics of Students with SBP. Of the students with access to the NSLP, 38.5 percent also had the SBP available--14.9 million students in 1983. Close to 32 percent of students with the SBP available were classified as eligible to receive a free USDA school breakfast. An additional 7.2 percent were eligible to pay a reduced-price for the breakfast and the remaining 61 percent paid full-price for the school breakfast if they elected to participate. Thus, a higher percentage of students under the SBP were eligible to receive either a free or reduced-price meal than under the NSLP. In fact, the program is designed specifically to target children in lower income families.

The pattern of participation in the SBP was quite different from the pattern observed for the NSLP. Most students, 76 percent, did not participate at all. Of the 24 percent who did participate, half ate a breakfast every day in the typical week. As with the lunch program, participation in the breakfast program was greatly enhanced among the free and reduced-price students. The overall participation rate among those receiving a free breakfast was close to 54 percent; the figure fell to 9 percent for students paying full-price.

One potentially important factor related to SBP participation was whether or not the child lived in a household where breakfast was prepared at home. While parents indicated that over 90 percent of the full-price students were in households where a breakfast was prepared at home, the same was true for only

65 percent of free meal students. The data suggest that participation rates in the school breakfast program were as high as 75 percent for students in the free meal category who potentially did not have breakfast available at home. However, the importance of this finding must be interpreted with caution as it is possible that the two events are inter-related--parents did not prepare breakfast at home because the child was expected to participate in the school breakfast.

Overview of the Factors Related to Frequency of Student Participation. Separate analyses were undertaken to better identify the factors related to the frequency of student participation in the school meal programs for each of the three price status groups. Because a student can participate on any or none of the five school days in a week, the variable measuring frequency of participation takes on a limited set of values, namely, 0 through 5. Hence, the models of student participation were estimated using an ordered probit function which takes into account the limited nature of the dependent variable.

The results underscored the significance of the roles played by grade level, child's sex, alternatives to the school meal, and the degree to which the student is responsible for deciding where to eat. For example, across the total sample of students, elementary students were estimated to have a probability of .80 of eating the school lunch on any given day; that figure fell to .69 for secondary level students. In the case of the SBP, elementary students were estimated to eat the breakfast about 25 percent of the time, whereas secondary students ate the breakfast roughly 10 percent of the time.

Over the course of one month, males were predicted to eat the school meal, be it breakfast or lunch, more often than females. For example, among elementary students, males were predicted to participate in the NSLP about 4.1

days per week while females participated about 3.8 days per week. Elementary males typically participated in the SBP about 1.5 days per week compared to .5 days per week for the elementary females.

Another potentially important factor was whether or not it was possible for the student to eat breakfast or lunch at home. In the case of the breakfast, elementary students in households where breakfast was not prepared at home tended to eat the school breakfast about 5 days out of 10 as compared to 2 days out of 10 for students in households where breakfast was prepared. Similar differences, although not quite as large, characterized the predictions among secondary students. The variable was also important in the case of the school lunch; students who were theoretically able to eat the lunch at home were predicted to participate in the NSLP about one-half day less often per week than other students.

If the student was the primary decision-maker with respect to where he or she ate, the probability of eating the school lunch is predicted to drop substantially. For example, elementary students who could decide where to eat participate in the school lunch about 73 percent of the time. In contrast, elementary students who did not have primary responsibility for deciding where to eat were likely to eat the NSLP about 85 percent of the time. The difference in probabilities was even greater among secondary level students, as one might expect due to a greater degree of flexibility in the food programs designed for that age group.

Finally, meal price was consistently estimated to have a significant, negative impact on the frequency of meal participation. That is, the higher

the meal price, the lower the frequency of student participation.[4] We describe the results with respect to estimated price effects in considerable detail below.

The Sensitivity of Students to Price Changes

Price Effects in the Lunch Models.[5] The degree to which students alter their frequency of participation in the face of meal price changes is critical information for policy analysis. In examining price effects, it is important to remember that these effects can operate via several student characteristics. The primary characteristic of interest is the price the student pays for a lunch, but meal price status per se is also potentially important. It was precisely because behavior is hypothesized to vary in a systematic fashion depending on meal price status that separate models were estimated for each of the three price status groups.

Estimates of the average daily probability of participation in the NSLP are shown in Table 1. Separate columns are presented for estimates based on the pooled sample of students and for the free and full-price students separately. Overall, the average daily participation rate is 75 percent; this rate

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4. In the case of the model estimated on data from reduced-price students, meal price was estimated to have a positive effect on participation--the higher the price, the more frequently the student was predicted to participate in the NSLP. These anomalous results were probably due to either the small number of reduced-price students, or the fact that there is very little variation in the price these students paid for a school lunch. The conclusion was drawn that is is not feasible to estimate a model of the frequency of reduced-price lunch participation with these data.

5. From a modeling perspective, a matter of statistical importance is the fact that meal price status, meal price paid, and household income are expected to be highly correlated. Note that meal price status was not included as an explicit explanatory variable in the equation for the total sample in which students from the three price status groups were pooled.

Table 1

Expected Average Daily Probability of Participating in the NSLP

Variable	Value	TOTAL SAMPLE	FREE	FULL
All Students		.75	.94	.58
Elementary Students		.80	.96	.61
Male	Yes	.82	.97	.68
Female	Yes	.77	.95	.58
Meal Price	$0.00	.93	—	.93
	.20	.89	—	.88
	.40	.84	—	.82
	.80	.68	—	.65
	1.50	.33	—	.28
Secondary Students		.69	.88	.54
Male	Yes	.74	.90	.60
Female	Yes	.65	.86	.48
Meal Price	$0.00	.88	—	.89
	.20	.83	—	.83
	.40	.75	—	.75
	.80	.56	—	.56
	1.50	.23	—	.21
Sample Size		3995	1369	2410

systematically varies between elementary and secondary students. This overall estimate is potentially misleading, however, because considerable differences in frequency of participation are estimated for the free and reduced-price students on the one hand, and for the full-price students on the other hand. The estimated participation rate for all students in the free meal category is 94 percent. In contrast, the participation rate is only 58 percent among students paying full meal prices.

Within each price class, elementary students are estimated to participate more frequently than secondary students. From the model estimated using the pooled sample, the younger students might be expected to eat a USDA school lunch almost 80 percent of the time--4 out of 5 days--whereas secondary students typically will eat the school lunch just under 70 percent of the time, on average. Participation rates are highest for elementary students in the free meal category and are lowest for secondary students paying full price. In fact, older students paying full price for the lunch only select the USDA lunch about half of the time.

Meal price has a significant effect on participation. Estimated participation rates are presented in Table 1 for selected prices that basically represent the low to high end of the meal price spectrum. For both the elementary and secondary students there is a clear inverse relationship between meal price and average daily participation rates. At a relatively high price of $1.50, elementary students are predicted to participate on any given day with a probability of .28.[6] As the price falls to $.80, which is close to the

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6. No one reported paying a lunch price higher than $1.25 in the NEISP-II sample of students; this figure was chosen for the sake of exposition. The median lunch price among students paying a non-zero price fell in the range from $.80 to $.85. Approximately 9 percent of the sample reported paying a lunch price of $1.00 or more. Similarly, roughly 8 percent reported paying a lunch price under $.50.

sample average price, the figure rises and about 65 percent of elementary students are estimated to select the USDA lunch on any given day. For prices of $.40 and $.20, the estimated participation rates continue to climb and suggest that somewhere between 82 and 88 percent of the elementary students will participate on any given day. Students in secondary schools exhibit much the same pattern of participation as prices decline from a level of $1.50 to $.20, except that, for a given price, secondary students are consistently predicted to participate less frequently than elementary students.

Finally, at a hypothetical price of zero the full-price students are estimated to participate 93 percent of the time in the elementary category and 89 percent of the time in the secondary category. This level of participation is essentially the same as that for the free price students in those same grade levels and it is interesting to conjecture that the observed differences in participation between the two price status groups may be primarily a function of the differences in meal price.

Price Effects in the Breakfast Models. As with the lunch models, the estimated price effects are of particular interest in the analysis of the breakfast models. In general, an increase in the meal price is estimated to lower the frequency of participation.

In Table 2 estimates of participation rates based on alternative assumptions about student characteristics are shown. Among elementary students in the full-price subgroup, the probability of participation on any given day is estimated to drop from .44 to .28 as the hypothetical price increases from $.0 to $.20; the figure drops still further to .16 if the price is increased to $.40. As price is increased from $.40 to $.60, average daily participation will decline to 3 percent. The results are analogous for the secondary level

Table 2

Expected Average Daily Probability of Participating in the SBP

Variable	Value	TOTAL SAMPLE	FREE	FULL[1]
All Students		.17	.48	.08
Elementary Students		.25	.52	.13
Male	Yes	.30	.59	.18
Female	Yes	.19	.44	.09
Meal Price	$0.00	.41	—	.44
	.20	.28	—	.28
	.40	.17	—	.16
	.80	.04	—	.03
Secondary Students		.10	.40	.05
Male	Yes	.13	.47	.07
Female	Yes	.07	.33	.03
Meal Price	$0.00	.21	—	.25
	.20	.12	—	.14
	.40	.06	—	.05
	.80	.01	—	.01
Sample Size		1776	746	903

1. The estimates of participation rates for the full-price sample are based on coefficients from a binary probit specification.

students paying full price, although the level of participation is always estimated to be lower at a given price. At a hypothetical breakfast price of $.80, it can be inferred from the estimates that almost no secondary level student will select a school breakfast.[7]

Price Elasticity of Meal Participation in the NSLP and the SBP. In the discussion above, the effects of changing meal price on the frequency of participation were analyzed. These price effects can be summarized conveniently by means of a measure known as the "price elasticity" of participation. From an intuitive perspective, the price elasticity measures the relative response in student participation behavior to a change in the price structure. Specifically, the price elasticity is defined as the percentage change in meal participation divided by the percentage change in meal price. This measure is particularly convenient for estimating the change in the number of meals served when a critical program parameter--meal price--is altered. In the discussion below, the behavior of a group of students is said to be price "inelastic" if participation changes by a smaller percentage than the percentage change in meal price--students are relatively "nonresponsive." Conversely, behavior is deemed "elastic" if the percentage change in participation is greater than the percentage change in meal price--students are relatively "responsive."

Estimates of the price elasticity at varying points in the price range for

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7. The average price paid for the breakfast (among paying students) is in the range between $.40 and $.46. Approximately 3 percent of the sample report paying a price $.75 or more; 6 percent of the sample report paying between $.10 and $.20.

both the NSLP and the SBP are presented in Table 3.[8] Within programs, separate estimates are presented for elementary and secondary students and for full-price students and the total sample of students. Estimates for students in the free meal category are not generated because it is not possible to estimate price effects for a subgroup in which there is no variation in price. Similarly, price variation among reduced-price students was not sufficient to estimate reasonable price effects.

Estimates are presented for a 25 percent increase in the meal price for a series of prices that range from low to high. For example, within the NSLP, price elasticity estimates, based separately on coefficients from the models estimated from the total and full-price samples, are presented at points ranging from $.40 to $1.00. In the case of the SBP, the range is from $.20 to $.65, reflecting the generally lower prices reported for the school breakfast.

Results for the NSLP are shown in the top of Table 17. Ranging between -.17 and -.95, the price elasticity for full-price elementary students is estimated to be relatively inelastic--that is, given a price increase, students reduce their participation in the NSLP by a smaller percentage than the price increase. At $.40, the decline in participation is almost negligible, on the order of 4 percent, as the price increases by 25 percent to $.50. At a meal price of $.80, an identical percentage increase in price elicits a 13 percent reduction in frequency of participation. Finally, at a meal price of $1.00, elementary students are predicted to cut back almost on a one-for-one basis--a 25 percent price increase results in a 24 percent reduction in average daily

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8. Individual student data is the basis for these calculations. As the price changes, each student's participation is predicted and individual elasticities are calculated. Mean elasticity estimates are shown in Table 3.

Table 3

Estimated Price Elasticity of Average Daily Meal Participation[1]

Change in Price	Low Price Range $.40 to $.50	Medium Price Range $.80 to $1.00	High Price Range $1.00 to $1.25
National School Lunch Program			
Elementary Students			
Total Sample	-.15	-.53	-.82
Full-price Sample	-.17	-.62	-.95
Secondary Students			
Total Sample	-.25	-.77	-1.12
Full-price Sample	-.26	-.82	-1.20
School Breakfast Program			
Change in Price	Low Price Range $.20 to $.25	Medium Price Range $.40 to $.50	High Price Range $.65 to $.80
Elementary Students			
Total Sample	-.46	-1.04	-1.88
Full-price Sample	-.54	-1.23	-2.20
Secondary Students			
Total Sample	-.60	-1.29	-2.21
Full	-.63	-1.40	-2.40

1. The price elasticity refers to the degree to which participation responds to changes in meal price and is defined as the percentage change in the average daily probability of participation divided by the percentage change in meal price. For example, a price elasticity of -.60 indicates that as price increases by 10 percent, participation decreases by 6 percent.

participation and the elasticity is estimated to approach unity. Thus, one important finding is that the price elasticity can be expected to vary, sometimes significantly, depending on the level of prices.

At every price level, secondary students are slightly more responsive to price changes than elementary students. In fact, at a lunch price of $1.00, the elasticity becomes price elastic: a 25 percent increase in the price of a USDA lunch results in a reduction in participation on the order of 30 percent.[9] Analogously, elasticities estimated on data from the total sample are slightly less elastic at every price point than those estimated on data from the full-price subsample, however, these differences are relatively minor in the case of the NSLP. Differences in the estimated elasticities by grade level are somewhat greater, although even these differences do not imply substantially different responses to price changes in practice. For example, if the lunch price rises from $.80 to $1.00, participation among elementary and secondary students in the full-price category is estimated to decline by approximately 16 percent and 20 percent, respectively. At higher prices, these differences grow slightly--the decline in participation is estimated to be roughly 24 percent and 30 percent for the elementary and secondary full-price students as the price rises to $1.25 from $1.00.

The results for the SBP show a similar pattern with respect to changes in the elasticity as the meal price rises--student participation becomes more price elastic as the price of the breakfast increases. In general, participation in the breakfast program is estimated to be price elastic, except at the low end of the price spectrum. This is perhaps not surprising since an

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9. Given certain configurations of characteristics, individual student participation may become price elastic at prices well below $1.00. The shape of the distribution of price elasticities is addressed below.

increase in the price from $.20 to $.25 is not likely to generate much of a response because the price is low in absolute terms, even after such a price increase. As the price rises, students increasingly modify their behavior in response to a given change in the meal price. At a meal price of $.40, elementary and secondary students alike are predicted to reduce participation by well over 25 percent if the price is increased by 25 percent to $.50. The median price paid for the breakfast, excluding students receiving free meals, is $.45. Around this price, the elasticity is estimated to be -1.23 for the elementary full-price students and -1.40 for the secondary full-price students. A 25 percent increase in the price from $.40 to $.50 results in a 31 to 35 percent reduction in participation rates, depending on grade level. When the breakfast price is increased to $.80 from $.65 (a 23 percent increase), the frequency of participation falls by 51 percent for the younger students and by 55 percent for the older students in the full-price category.

To be useful in the context of certain policy deliberations, the estimates presented above, which were presented separately for elementary and secondary students, have been reworked to provide an overall average estimate of the price elasticity for each of the two meal programs. The estimates are based on the model estimated from data on the total sample of data and are presented for a 5 cent increase in the meal price across a set of prices, including the median meal price. As with the previous estimates, individual student data was the basis for these calculations--that is, as the price changed, each student's participation was predicted and individual elasticities were calculated. The sample mean and standard deviation for the elasticity estimates were derived and these estimates, along with the minimum and maximum values observed, are presented in Table 4.

Table 4

TOTAL SAMPLE PRICE ELASTICITY OF PARTICIPATION ESTIMATES

Price Change	Mean ADP Change	Price Elasticity			
		Mean	Stan. Dev.	Min.	Max.
		National School Lunch Program			
$ .20-$ .25	.845-.831	-.07	.04	-.21	-.01
$ .40-$ .45	.781-.763	-.20	.08	-.51	-.05
$ .50-$ .55	.745-.725	-.28	.11	-.69	-.07
$ .55-$ .60	.725-.705	-.33	.13	-.79	-.09
$ .60-$ .65	.705-.684	-.38	.14	-.90	-.11
$ .70-$ .75	.662-.640	-.50	.18	-1.13	-.15
$ .80-$ .85*	.618-.595	-.64	.21	-1.38	-.21
$ .90-$ .95	.571-.548	-.81	.25	-1.67	-.28
$1.00-$1.05	.524-.500	-.99	.29	-1.97	-.37
$1.10-$1.15	.476-.452	-1.20	.33	-2.30	-.48
$1.20-$1.25	.423-.405	-1.43	.38	-2.66	-.60
		School Breakfast Program			
$ .20-$ .25	.234-.211	-.52	.16	-.82	-.05
$ .25-$ .30	.211-.190	-.68	.20	-1.05	-.07
$ .40-$ .45	.152-.135	-1.23	.34	-1.85	-.18
$ .45-$ .50*	.135-.120	-1.44	.38	-2.14	-.23
$ .50-$ .55	.120-.106	-1.66	.43	-2.44	-.29
$ .60-$ .65	.093-.081	-2.15	.52	-3.08	-.43
$ .70-$ .75	.071-.062	-2.68	.61	-3.77	-.62
$ .80-$ .85	.053-.046	-3.27	.70	-4.50	-.85

*Median price is in this range.

Note: The price elasticity is defined as the percentage change in the average daily probability of participation (ADP) divided by the percentage change in meal price. The elasticities presented above are based on the ordered probit models estimated using individual student data. For each student we calculated estimates of the price elasticity for the price combinations shown above. Hence, the elasticities in the table above are averages across the total sample of students. The methodology for calculating the predicted ADP is shown in Appendix C.

In the panel showing the estimates for the NSLP, it is clear that elasticity estimates for the total sample follow the same patterns as were found when we looked at more disaggregated figures. The estimates indicate that the value of the elasticity changes from -.07 at a meal price of $.20 to -1.43 at a meal price of $1.20. At the median lunch price of $.80 (among paying students), a 5 cent increase in the price to $.85 (which is a 6.25% increase in price) results in average daily participation rates falling by about 3.7 percent. The estimate of the average price elasticity at this point is -.64, i.e., behavior is price inelastic.[10] Put into the context of actual program data, this elasticity figure implies that an increase in the lunch price from $.80 to $.85 would have resulted in 17.5 million fewer lunches being served in October, 1983. NSLP program data from that month indicate that 436.8 million school lunches were served during that month.

Once again, the overall estimates of the price elasticity for the breakfast program indicate how price elastic participation is in the range of relevant prices. For the same meal price, the SBP is always estimated to be more price elastic than the NSLP. At a meal price of $.20, the breakfast price elasticity is estimated to be around -.52, that is, relatively inelastic. However, at a meal price of $.40, students become price elastic, on average, and at the median breakfast price of $.45, the average elasticity is estimated at -1.44. Thus, for every 1.0 percent increase in meal price, participation declines by

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10. Akin, Guilkey, Popkin, and Wyckoff (1983) estimated a model of participation in the NSLP using data from the 1977-1978 Nationwide Food Consumption Survey. The price elasticity of demand for the school lunch was estimated to be .40, which is relatively inelastic, and does not vary significantly across primary and secondary grade levels. Hence, the authors estimated that a 50 percent increase in the price charged to students paying full price will result in a 20 percent reduction in participation.

just under 1.5 percent. Using SBP program data from October, 1983, in which 65.9 million USDA breakfasts were served, if the breakfast price had increased from $.45 to $.50 (an 11.1 percent increase), breakfast service would have declined by about 10.5 million meals in that month. At a breakfast price of $.80, the average elasticity is estimated to be -3.27, i.e., the average student is highly price elastic. In this region, a 10 percent increase in the breakfast price would cut participation by almost one-third.

. Summary of Price Effects. The price elasticity of participation provides a convenient measure to judge student response to a change in meal prices. In the case of the school lunch, the price elasticity was estimated to be inelastic in general; that is, students were relatively nonresponsive to price changes, especially for changes occurring at the low end of the price range. The median price of the school lunch in 1983 was about 80 cents and at that price the average elasticity was estimated to be -.64. From this it can be projected that a 6.25 percent increase in the lunch price to $.85 would have resulted in a decline in lunch service on the order of 4 percent. The data do suggest, however, that as the meal price rose, students became more responsive to price changes; for lunch prices over $1.00, it is expected that a percentage increase in the price would elicit a greater percentage reduction in average participation rates.

Participation in the SBP is more elastic than participation in the NSLP. At the sample median breakfast price of $.45, the average elasticity was estimated to be -1.44: it is projected that a 10 percent increase in the price of a school breakfast would result in participation rates falling by just under 15 percent. As the breakfast price rises, students cut back participation even more rapidly in the face of price increases. At a breakfast price of $.80, it

is believed that a 10 percent increase would have cut participation by about one-third.

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